

**REMARKS**

Claims 1-9 and 11-54 are pending in this application. Claims 1-9 and 11-20 have been elected for prosecution on the merits, of which claims 1, 4, 5, and 6 are independent.

**Allowable Subject Matter**

Applicants wish to thank the Examiner for indicating that claims 2 and 3 contain allowable subject matter.

**Interview**

Applicants wish to thank the Examiner and his Supervisor for conducting the interview on September 13, 2004. Applicants believe that as a result of the interview the Examiner has a better understanding of the invention as it relates to the prior art of record.

Based on the interview, Applicants have amended the independent claims 1, 4, 5, and 6 in order to clarify the perspective of the invention that Applicants had intended in the original claims. Accordingly, **Applicants respectfully request that the amendment be entered and considered.** If further amendment is deemed necessary in the context of discussion during the interview, Applicants request that the Examiner contact the undersigned in order to arrange for a **telephone interview**.

**Claim Rejection – 35 USC 102; Tanaka**

Claim 1 has been rejected under 35 U.S.C. 102(b) as being anticipated by Tanaka (U.S. Patent 5,177,753). Applicants have amended claim 1 and based on this amendment, respectfully traverse this rejection.

The Office Action states that, “the resin 15/18/20 as corresponding to the claimed resin” (Office Action, page 3, lines 9 and 10). In other words, the combination of Tanaka’s transparent resin material 15, material of the waveguide member 18, and protective seal resin material 20 has been interpreted as being the claimed resin.

Claim 1 was intended to recite that the resin that forms the molded lens has light diffusion capability and encapsulates the semiconductor laser chip. In order to clarify the intended meaning of the claim, Applicants have amended the claim to recite that the molded lens encapsulates the semiconductor laser chip and is made of a resin having light diffusion capability.

Tanaka discloses a semiconductor laser device (see Figures 2, 5, and 6) having a smooth, transparent resin 15 and optionally a glass plate 16 placed in front of the front cleavage face 5a of the laser chip 5, and wherein a waveguide element 18 is provided between the rear cleavage face 5b of the laser to direct laser light from the rear cleavage face to a light receiving element 7 for monitoring the laser beam. A protective resin material 20 is

applied to the upper surface of the transparent resin material 15 up to the waveguide member 18.

Tanaka's transparent resin material 15 is disclosed as possibly being formed as a lens and covers the front face of the laser chip. Applicants submit that, unlike the present claimed invention, Tanaka's transparent resin material 15 does not encapsulate the semiconductor laser chip. Furthermore, Applicants submit that Tanaka's resin material 15 is not at least a resin compound comprising two or more materials of different refractive indexes providing light diffusion capability, wherein the laser light emitted from the semiconductor laser chip is diffused through the molded lens.

Thus, Applicants submit that Tanaka fails to teach or suggest each and every claimed element. Accordingly, Applicants respectfully request that the rejection be withdrawn.

#### **Claim Rejections – 35 USC 103**

Independent claim 4, as well as claims 7, 16 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Thornton et al. (U.S. Patent 5,386,428). Applicants respectfully traverse this rejection.

Similar to the above for claim 1, claim 4 recites, "a semiconductor laser chip encapsulated within a molded lens, said molded lens made of resin having a light diffusion capability."

Thus, similar as in the above for claim 1, because the transparent resin material 15, optionally having a curved face as in a convex lens, does not encapsulate the semiconductor laser chip and does not have a light diffusion capability, Applicants submit that Tanaka fails to teach each and every element of claim 4, as well.

Thornton discloses a stacked active laser array that outputs multicolor laser beams. Unlike Thornton, Tanaka discloses a laser unit that projects a laser beam from a front cleavage face and receives a laser beam at a rear cleavage face, where the rear cleavage face is connected by a waveguide member 18. Thus, Applicants submit that there is insufficient disclosure to enable the combination of Tanaka and Thornton. In any case, Thornton also fails to teach or suggest a semiconductor laser encapsulated within a molded lens, said molded lens made of resin having a light diffusion capability.

Furthermore, an aspect of the present invention is to reduce light density so that laser light emitted from the laser chip via the molded resin is safe for human vision. Applicants have found that by incorporating a semiconductor laser having a plurality of light emitting portions, not only is light density reduced, but also the resistance of the semiconductor laser is reduced, leading to a lower required driving voltage and an improvement in the reliability of the device (specification, page 22, lines 12-18). Applicants submit that such a result would not have been expected given the teachings of Thornton. At least for this

reason, Applicants submit that the present invention produces an unexpected result.

Accordingly, the rejection fails to establish *prima facie* obviousness for claims 4, 7, and 16. Applicants respectfully request that the rejection be withdrawn.

**Claim Rejection – 35 USC 103**

Claims 4 and 7 have also been rejected under 35 U.S.C. 103(a) based on Tanaka in view of Claisse et al. (Electronics Letters, previously applied). Applicants respectfully traverse this rejection.

The same arguments as in the above for claim 4, apply as well to this rejection. Again because the transparent resin material 15, optionally having a curved face as in a convex lens, does not encapsulate the semiconductor laser chip and does not have a light diffusion capability, Applicants submit that Tanaka fails to teach each and every element of claim 4, as well.

The Office Action relies on Claisse for teaching a plurality of light emitting portions, admitted as missing from Tanaka. Further, Claisse is relied on for teaching an improvement in internal quantum efficiency of multiple quantum wells over single quantum wells in semiconductor laser chips (Claisse: Figure 2). That teaching is used as a basis for a motivation to combine Claisse with Tanaka.

Claisse is directed to principles of quantum efficiency in laser diodes. Near the end of the article, it mentions that the use of multiquantum well

has resulted in an improvement in values of internal quantum efficiency for short cavity lasers. Claisse does not actually disclose a specific semiconductor laser device and does not teach a diffused light capability for purposes of safe laser light emission.

Thus, Applicants submit that Claisse does not at least make up for the deficiencies in Tanaka. Therefore, the rejection fails to establish *prima facie* obviousness.

### **Claim Rejection – 35 USC 103**

Independent Claim 5, as well as claim 8, have been rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Hirayama et al. (U.S. Patent 5,970,081, previously applied).

Claim 5, as amended, is directed to a semiconductor laser device including a semiconductor laser chip encapsulated within a molded lens, said molded lens made of resin having a light diffusion capability, wherein the semiconductor laser chip includes at least one light emitting portion having a width of about 7  $\mu\text{m}$  or more.

Tanaka discloses a semiconductor laser device (see Figures 2, 5, and 6) having a smooth, transparent resin 15 and optionally a glass plate 16 placed in front of the front cleavage face 5a of the laser chip 5, and wherein a waveguide element 18 is provided between the rear cleavage face 5b of the laser to direct laser light from the rear cleavage face to a light receiving element 7 for monitoring the laser beam. A protective resin material 20 is

applied to the upper surface of the transparent resin material 15 up to the waveguide member 18.

In the claimed invention, the molded lens encapsulates the semiconductor laser chip and is made of resin having a light diffusion capability. In Tanaka, the transparent resin material 15 for light emitted from the laser chip does not encapsulate the laser chip and does not have a light diffusion capability.

Rather the laser chip in Tanaka is encapsulated with three different components of different materials. The three components do not collectively form a lens. The transparent resin material 15, optionally having a curved face as in a convex lens (column 5, lines 3-9), is formed to cover just the front cleavage face 5a of the laser chip (column 3, lines 15-16).

Because the transparent resin material 15, optionally having a curved face as in a convex lens, does not encapsulate the semiconductor laser chip and does not have a light diffusion capability, Applicants submit that Tanaka fails to teach each and every element of claim 5, as well.

Hirayama is directed to a grating coupled surface emitting device for outputting light by a diffraction grating. The emitting device is capable of attaining substantially ideal emission pattern of radiation-mode light, and increasing the coupling efficiency with an optical fiber (column 2, lines 26-31). Hirayama discloses an embodiment capable of emitting a light pattern having a spot size of 18  $\mu\text{m}$  (column 6, lines 48-

50). Because the large spot size is for purposes of coupling with an optical fiber, Hirayama's large spot size is not for purposes of safety to human vision.

Thus, Hirayama does not at least make up for the deficiencies of Takama with respect to an encapsulating resin. Therefore the rejection fails to establish prima facie obviousness for claims 5 and 8. Applicants respectfully request that the rejection be withdrawn.

**Claim Rejection – 35 USC 103**

Independent claim 6, as well as claims 9 and 20, have been rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Andrews (U.S. Patent 5,422,905, previously applied).

Claim 6, as amended, is directed to a semiconductor laser device including a semiconductor laser chip encapsulated within a molded lens, said molded lens made of resin having a light diffusion capability, and further including at least one additional semiconductor laser chip.

Tanaka discloses a semiconductor laser device (see Figures 2, 5, and 6) having a smooth, transparent resin 15 and optionally a glass plate 16 placed in front of the front cleavage face 5a of the laser chip 5, and wherein a waveguide element 18 is provided between the rear cleavage face 5b of the laser to direct laser light from the rear cleavage face to a light receiving element 7 for monitoring the laser beam. A protective resin material 20 is applied to the upper surface of the transparent resin material 15 up to the waveguide member 18.

In the claimed invention, the molded lens encapsulates the semiconductor laser chip has a light diffusion capability. In Tanaka, the transparent resin material 15 for light emitted from the laser chip does not encapsulate the laser chip and does not have a light diffusion capability.

Rather the laser chip in Tanaka is encapsulated with three different components of different materials. The three components do not collectively form a lens. The transparent resin material 15, optionally having a curved face as in a convex lens (column 5, lines 3-9), is formed to cover the front cleavage face 5a of the laser chip (column 3, lines 15-16).

Because the transparent resin material 15, optionally having a curved face as in a convex lens, does not encapsulate the semiconductor laser chip and does not have a light diffusion capability, Applicants submit that Tanaka fails to teach each and every element of claim 6, as well.

Andrews is relied on for teaching at least one additional semiconductor laser chip. Andrews is concerned with a method for producing closely spaced and aligned semiconductor laser chips. Andrews does not teach or suggest a molded lens made of resin encapsulating the semiconductor laser chips.

Thus, Andrews does not at least make up for the deficiencies of Tanaka with respect to an encapsulating molded lens. Therefore the rejection fails to establish prima facie obviousness for claims 6, 9 and 20. Applicants respectfully request that the rejection be withdrawn.

**Claim Rejections – 35 USC 103**

Claim 11 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka and Okuda (U.S. Patent 6,049,423). Claims 12 and 13 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka as applied to claim 1, in view of Andrews, Brooks et al., or Missaggia. Applicants respectfully traverse these rejections.

At least for the same reasons as above for claim 1, Applicants submit that *prima facie* obviousness has not been established for claims 11, 12, and 13.

Claims 14 and 15 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka and Claisse as applied to claim 4, and further in view of Hazell et al.

At least for the same reasons as above for claim 4, Applicants submit that *prima facie* obviousness has not been established for claims 14 and 15.

Claim 17 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Andrews (U.S. Patent 5,422,905) as applied to claim 6, and further in view of Andrews (U.S. Patent 5,357,536, “Andrews 2”).

At least for the same reasons as above for claim 6, Applicants submit that *prima facie* obviousness has not been established for claim 17.

Claims 18 and 19 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Tanaka in view of Marinace et al. (U.S. Patent 3,614,550) and Koechner (ISBN 0-387-90167-1).

At least for the same reasons as above for claim 1, Applicants submit that *prima facie* obviousness has not been established for claims 18 and 19.

Applicants respectfully request that the rejections be withdrawn.

### **CONCLUSION**

All objections and rejections raised in the Office Action having been addressed, it is respectfully submitted that the present application is in condition for allowance and such allowance is respectfully solicited. Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert W. Downs (Reg. No. 48,222), to conduct an interview in an effort to expedite prosecution in connection with the present application.

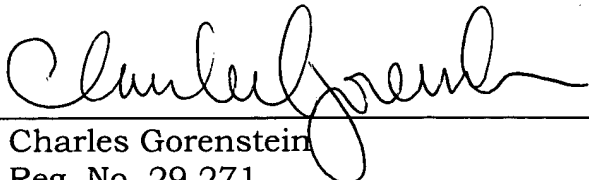
Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a one (1) month extension of time for filing a reply in connection with the present application, and the required fee of \$110.00 is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees

required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH &, BIRCH, LLP

By:   
Charles Gorenstein  
Reg. No. 29,271

*RWD*  
CG/RWD/ph/lab  
(703) 205-8000  
0717-0445P

P.O. Box 747  
Falls Church, VA 22040-0747  
(703) 205-8000